Cost Estimation Tool
Demonstration Prototype

SEEDS Workshop, March 18-20, 2003

SEEDS LOS/CE Study
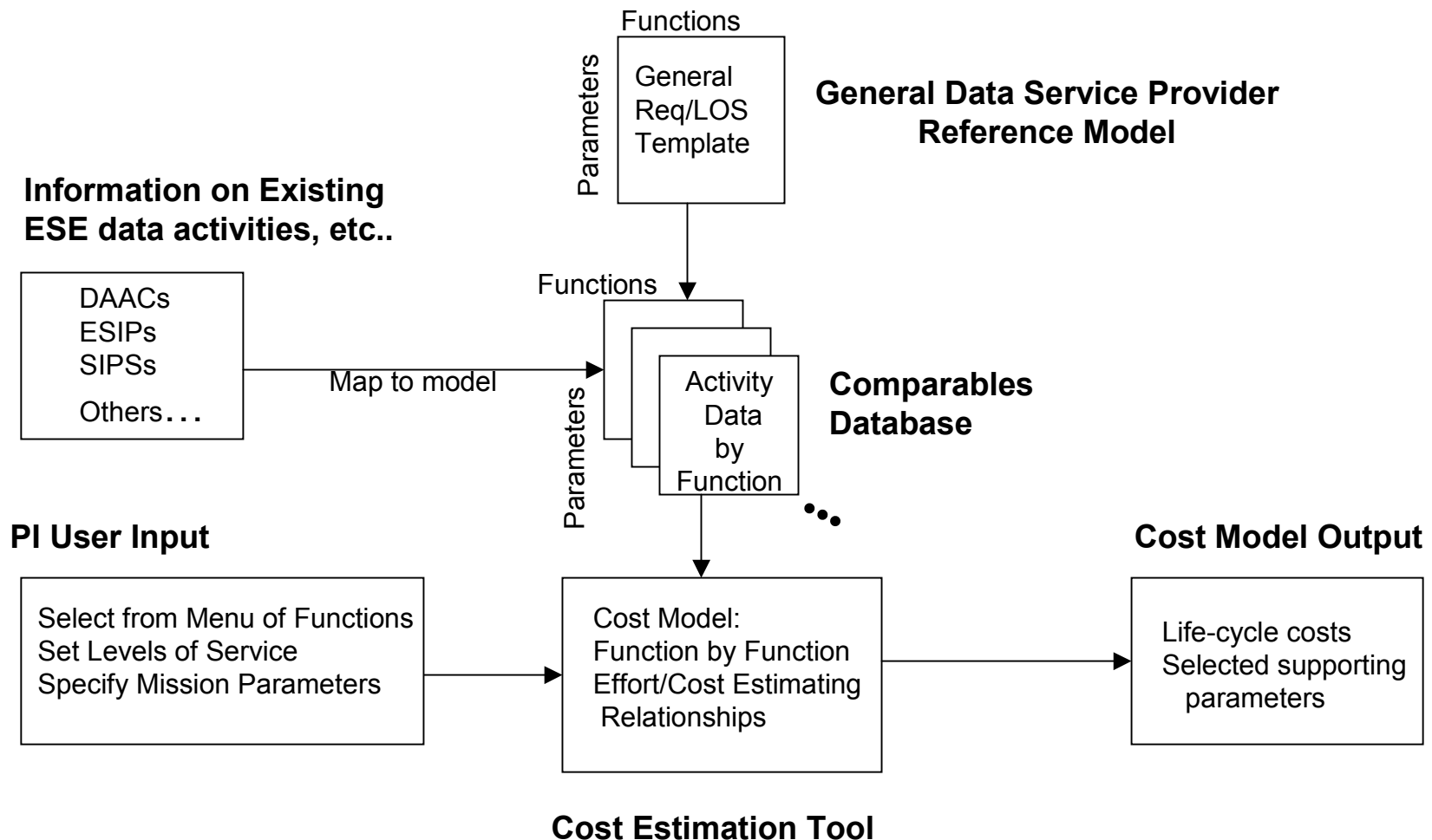**(Levels of Service / Cost Estimation)**

Greg Hunolt, Bud Booth, Mel Banks SGT

Agenda

- **Cost Estimation Tool (CET) Concept**
- **Demonstration Prototype – Working Prototype**
- **CET Implementation**
- **Progress Since Second SEEDS Workshop, June 2002**
- **Schedule – Next Steps**
- **Now you see it…**

Concepts: Requirements/LOS,
Data Service Provider Reference Model, Cost Estimation

Principal Investigator Point of View: Single DSP

Functions

Parameters

General
Req/LOS
Template

**General Data Service Provider
Reference Model**

**Information on Existing
ESE data activities, etc..**

Functions

DAACs
ESIPs
SIPSs

Others...

Map to model

Parameters

Activity
Data
by
Function

**Comparables
Database**

PI User Input

Cost Model Output

Select from Menu of Functions
Set Levels of Service
Specify Mission Parameters

Cost Model:
Function by Function
Effort/Cost Estimating
Relationships

Life-cycle costs
Selected supporting
parameters

Cost Estimation Tool

3

Demonstration Prototype – Working Prototype

The Demonstration Prototype:

- Employs an initial set of simple EER/CERs (Effort Estimating & Cost Estimating Relationships) based on the limited comparables database to produce a life cycle cost estimate.
- Shows how the CET will work, how a user will use it.
- A proof-of-concept, though limited database and simple EER/CERs limits its ability to provide reliable estimates.

The Working Prototype will:

- Employ an improved set of EER/CERs based on better comparables database (8-10 activities minimum).
- Produce life cycle cost estimates, with performance measures based on independent case testing.
- Incorporate feedback from Tirekicking of Demonstration Prototype.

CET Implementation

- **Comparables Database (CBD):**
  - **Excel Workbook, one worksheet for each data activity.**
- **Cost Estimation Tool (CET):**
  - **Excel VBA (Visual Basic for Applications) Project**
  - **CET workbook includes Activity Dataset worksheets that the user builds – these describe the user's data activity(s) or user's 'what-if' variants to be estimated, and other internal worksheets.**
  - **Cost estimation implemented in VBA software.**
- **Package as distributed to user:**
  - **CET and CDB workbooks; user needs PC or Mac, Excel 97-2002.**
  - **Identity of CBD activities is hidden.**
  - **Users' Guide, other documentation, examples.**
- **Data Service Provider Reference Model is the Underpinning:**
  - **Functional Areas – Requirements/Levels of Service – Parameters**
  - **Includes and Organizes all Parameters used by Cost-by-Analogy Model and Comparables Database**
  - **Working definition in hand, updated per workshops (WP-3, WP-5, WP-4).**

Progress Since June 2002 Workshop

- **Comparables Database (CDB):**

  **March 2003, data from fourteen activities compiled to constitute CDB
  Goal for April, 2003 is 8 to 10; the 14 are not 100% complete.**

- **Cost Estimation Tool (CET):**

  October 2002 -Demonstration Prototype, running with early CBD, implements "P.I." scenario presented at the June SEEDS Workshop (see Background charts).

  December 2002 – Demonstration Prototype Package was released to TireKickers, to date three very useful responses have been received (next chart for highlights).

  February 2003 – Began testing against independent cases, producing error measures.

  March 2003 – Progressing toward May release of Working Prototype

Tirekicking Results - Highlights

- Tirekickers: Jim Frenzer of the LaRC DAAC, Vince Troisi of the NSIDC DAAC, and Catherine Corlan, GSFC. Thank you!!

- **Overall Operation of the CET**
  - Generally positive, easy to get going and use, some specific problems noted.

- **CET Activity Data Set Content**
  - Consider suggestions made for a few additional items.
  - Allow for re-use of existing resources.

- **CET Output - Content of Life Cycle Estimate**
  - Include a 'nearness of fit' or other indicators that suggest 'how much to trust the numbers'.

- **CET User Interface**
  - Review the data entry screens for consistency of 'look and feel'.
  - Greatly improve testing of the user interface for Mac platforms. (A single version of the CET for both PC and Mac may not be feasible.)
  - Allow the user to back out of data entry screens to a logical previous step.
  - User entry error checking was good.

- **Users' Guide**
  - Generally favorable response, a number of specific suggestions.

Schedule – Next Steps

- **April 1 , 2003 - Preliminary Comparables Database (8-10 activities minimum)**
- **May 1, 2003 - Working Prototype Cost Estimation Toolkit**
- **May – June, 2003 – Second Round of Tirekicking**
- **September 1, 2003 - Initial Operating Capability Comparables Database (12-15 activities minimum)**
- **September 30, 2003 - Initial Operating Capability Operating Cost Estimation Toolkit**
- **October – November, 2003 – Third Round of Tirekicking**
- **April 1, 2004 - Operational CDB (20 to 25 activities minimum)**
- **May 1, 2004 – Operational Cost Estimation Toolkit**

Background

Cost Estimating Approach

- **Staff effort is estimated from workload (using "effort estimating relationships") then user's projected local labor rates are applied to produce estimate of costs.**

- **Estimating effort is done function by function, so CDB comparison is with data for functions rather than with whole activities.**

- **Non-staff items are based on cost history, will use 'cost curves' etc., for projections.**

- **Implementation estimates are, so far, very simple comparisons with CDB sites.**

- **A COTS product, ModelBuilder, will be used to develop better estimating relationships as we expand the CDB.**

- **Parameter list will be reduced as we see:**
  a) which parameters we can actually get from current activities, and
  b) which of the parameters we can get are actually most useful.

- **New parameters (some suggestions pending) may be added where needed to improve performance.**

Effort Estimating – So Far

- **Employ objective 'nearness' approach that uses key parameters (e.g 'work' as defined for Benchmark study) to compare each function of new activity with functions of CDB activities to toss relative outliers.**

- **Compute averages of annual workload parameters and staffing levels for each functional area for each CDB activity, average costs for non-staff items.**

- **Compute ratios of effort (FTE) to workload for each parameter ('e-w' ratios) within each functional area.**

- **Compute "screened" average of the e-w ratios across the CDB activities for each parameter within each function. Screening drops outliers – now by excluding extremes.**

- **Assign a weighting value to each parameter.**

- **Compute year by year staffing for new activity by multiplying e-w ratios by annual workload for the new activity and computing weighted average for each functional area's staffing categories.**